

WHAT IS CLAIMED IS:

1. An image pickup device, comprising:

a substrate;

5 an electromagnetic receiving area on the substrate;

a peripheral circuit around the electromagnetic receiving area, and
electrically connected to the electromagnetic receiving area; and

a plurality of stitching studs passing through the substrate, and
electrically connected to the peripheral circuit.

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2. The image pickup device of claim 1, wherein the image pickup device
further comprises a transparent window, attached onto the substrate and
located above the electromagnetic receiving area.

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3. The image pickup device of claim 2, wherein the image pickup device
further comprises an adhesive layer placed between the substrate and the
transparent window.

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4. The image pickup device of claim 2, wherein the image pickup device
further comprises a sustain layer placed between the substrate and the
transparent window.

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5. The image pickup device of claim 2, wherein the image pickup device
further comprises a plurality of holes and corresponding extrusions formed on
adjacent surfaces of the substrate and the transparent window.

6. The image pickup device of claim 1, wherein the electromagnetic receiving area comprises a plurality of electromagnetic receiving elements.

5 7. An imaging module, comprising:
an image pickup device, comprising:
a substrate;
an electromagnetic receiving area on the substrate;
a peripheral circuit around the electromagnetic receiving area,
10 and electrically connected to the electromagnetic receiving area; and
a plurality of stitching studs passing through the substrate, and
electrically connected to the peripheral circuit;
an optical lens system, configured on the image pickup device with
respect to the electromagnetic receiving area; and
15 an image control module, electrically connected to the stitching studs.

8. The imaging module of claim 7, wherein the image pickup device further comprises a transparent window, attached onto the substrate and located above the electromagnetic receiving area.

20 9. The imaging module of claim 7, wherein the imaging module further comprises an adhesive layer placed between the image pickup device and the optical lens system.

10. The imaging module of claim 7, wherein the imaging module further comprises a sustain layer placed between the image pickup device and the optical lens system.

5 11. The imaging module of claim 7, wherein the imaging module further comprises a plurality of holes and corresponding extrusions formed on adjacent surfaces of the image pickup device and the optical lens system.

12. The imaging module of claim 7, wherein the optical lens system is a
10 fixed focal length type optical lens system or an adjustable focal length optical lens system.

13. The imaging module of claim 12, wherein when the optical lens
system is the adjustable focal length optical lens system, the optical lens
15 system and the image pickup device are configured with zoom parts to adjust a relative distance therebetween.

14. The imaging module of claim 7, wherein the imaging module further
comprises a flexible conductive element connecting the image pickup device
20 and the image control module.

15. A manufacturing method of an image pickup device, comprising:
providing a substrate;
forming an electromagnetic receiving area on a first surface of the
25 substrate;

forming a peripheral circuit around the electromagnetic receiving area,
wherein the peripheral circuit is connected to the electromagnetic receiving area;
and

forming a plurality of stitching studs passing through the substrate,
5 wherein the stitching studs are connected to the peripheral circuit.

16. The manufacturing method of claim 15, wherein the manufacturing
method further comprises attaching a transparent window onto the substrate,
wherein the transparent window is located above the electromagnetic receiving
10 area.

17. The manufacturing method of claim 16, wherein the attaching step
comprises providing an adhesive layer between the substrate and the
transparent window.

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18. The manufacturing method of claim 16, wherein the attaching step
comprises forming a sustain layer between the substrate and the transparent
window.

20 19. The manufacturing method of claim 16, wherein the attaching step
comprises:

forming a plurality of holes and corresponding extrusions on adjacent
surfaces of the substrate and the transparent window; and

matching the holes with the extrusions to combine the substrate and the
25 transparent window.

20. The manufacturing method of claim 15, wherein the electromagnetic receiving area comprises a plurality of electromagnetic receiving elements.

5 21. The manufacturing method of claim 15, wherein the step of forming the stitching studs comprises:

 forming a plurality of trenches in the first surface of the substrate;

 forming insulating films inside the trenches;

 filling the trenches with a conductive material to form a plurality of
10 stitching plugs; and

 thinning a second surface of the substrate to expose ends of the stitching plugs, thus obtaining the stitching studs.

 22. The manufacturing method of claim 15, wherein the step of forming
15 the stitching studs comprises:

 forming a plurality of trenches in a second surface of the substrate;

 forming insulating films inside the trenches; and

 filling the trenches with a conductive material to form the stitching studs.

20 23. The manufacturing method of claim 15, wherein the step of forming the stitching studs comprises:

 forming a plurality of first trenches in the first surface of the substrate;

 forming a plurality of second trenches in a second surface of the substrate, wherein the second trenches match up with the first trenches;

25 forming insulating films inside the trenches; and

filling the trenches with a conductive material to form the stitching studs.

24. The manufacturing method of claim 23, wherein the steps of forming the insulating films inside and filling the first trenches and the second trenches
5 with a conductive material are separate steps.

25. A manufacturing method of an imaging module, comprising:

providing an image pickup device, comprising:

providing a substrate;

10 forming an electromagnetic receiving area on a first surface of the substrate;

forming a peripheral circuit around the electromagnetic receiving area, wherein the peripheral circuit is connected to the electromagnetic receiving area; and

15 forming a plurality of stitching studs passing through the substrate, wherein the stitching studs are connected to the peripheral circuit;

configuring an optical lens system on the image pickup device with respect to the electromagnetic receiving area; and

electrically connecting an image control module to the stitching studs.

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26. The manufacturing method of claim 25, wherein the manufacturing method further comprises attaching a transparent window onto the substrate, wherein the transparent window is located above the electromagnetic receiving area.

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27. The manufacturing method of claim 25, wherein the configuring step comprises providing an adhesive layer between the image pickup device and the optical lens system.

5 28. The manufacturing method of claim 25, wherein the configuring step comprises forming a sustain layer between the image pickup device and the optical lens system.

29. The manufacturing method of claim 25, wherein the configuring step
10 comprises:

forming a plurality of holes and corresponding extrusions on adjacent surfaces of the image pickup device and the optical lens system; and

matching the holes with the extrusions to combine the image pickup device and the optical lens system.

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30. The manufacturing method of claim 25, wherein the step of forming the stitching studs comprises:

forming a plurality of trenches in the first surface of the substrate;

forming insulating films inside the trenches;

20 filling the trenches with a conductive material to form a plurality of stitching plugs; and

 thinning a second surface of the substrate to expose ends of the stitching plugs, thus obtaining the stitching studs.

31. The manufacturing method of claim 25, wherein the step of forming the stitching studs comprises:

forming a plurality of trenches in a second surface of the substrate;

forming insulating films inside the trenches; and

5 filling the trenches with a conductive material to form the stitching studs.

32. The manufacturing method of claim 25, wherein the step of forming the stitching studs comprises:

forming a plurality of first trenches in the first surface of the substrate;

10 forming a plurality of second trenches in a second surface of the substrate, wherein the second trenches match up with the first trenches;

forming insulating films inside the trenches; and

filling the trenches with a conductive material to form the stitching studs.

15 33. The manufacturing method of claim 32, wherein the steps of forming the insulating films inside and filling the first trenches and the second trenches with a conductive material are separate steps.

34. The manufacturing method of claim 25, wherein the optical lens
20 system is a fixed focal length type optical lens system or an adjustable focal length optical lens system.

35. The manufacturing method of claim 34, wherein when the optical lens system is the adjustable focal length optical lens system, the manufacturing

method further comprises configuring zoom parts on the optical lens system and the image pickup device to adjust a relative distance therebetween.

36. The manufacturing method of claim 25, wherein the electrically
5 connecting step comprises electrically connecting the image pickup device and the image control module with a flexible conductive element.

37. The manufacturing method of claim 25, wherein the image pickup
device and the image control module are electrically connected by an isotropic
10 conductive adhesive used in studs bumping bonding, surface mounting, anisotropic connection film (ACF), gold or solder bumping, wiring, ball grid array, flexible cable or flip chip.